

CAMS21a Phase 2, WP1 & WP4

Consolidation of aerosol in situ data production, network extension
and operational data production

ECAC-WCCAP
ECAC-ACMCC
ACTRIS IS DC (EBAS)



CAMS 21a Phase 1 (2020-2022)

ACTRIS-CAMS in-situ IS Pilot is a pilot project for the ACTRIS/aerosol in-situ data provision to the Copernicus Atmosphere Monitoring Service (CAMS), with the main aim of demonstrating the feasibility of fully traceable and quality controlled data provision and setting up the system of data provision for the whole network.

The objective of ACTRIS-CAMS in-situ Pilot is to demonstrate the process by which ACTRIS data can be provided in Near Real Time (NRT)³ with the highest possible quality. The project will focus on 5 variables (particle number concentration, particle number size distribution, particle light scattering and absorption coefficients, mass concentration of non-refractory particulate organics and inorganics). For each variable, the current process for NRT submission will be upgraded by the different units of CAIS involved, tested at several sites and expanded to the ACTRIS network of stations. In the meantime, the most suitable options for delivering the data NRT will be investigated.

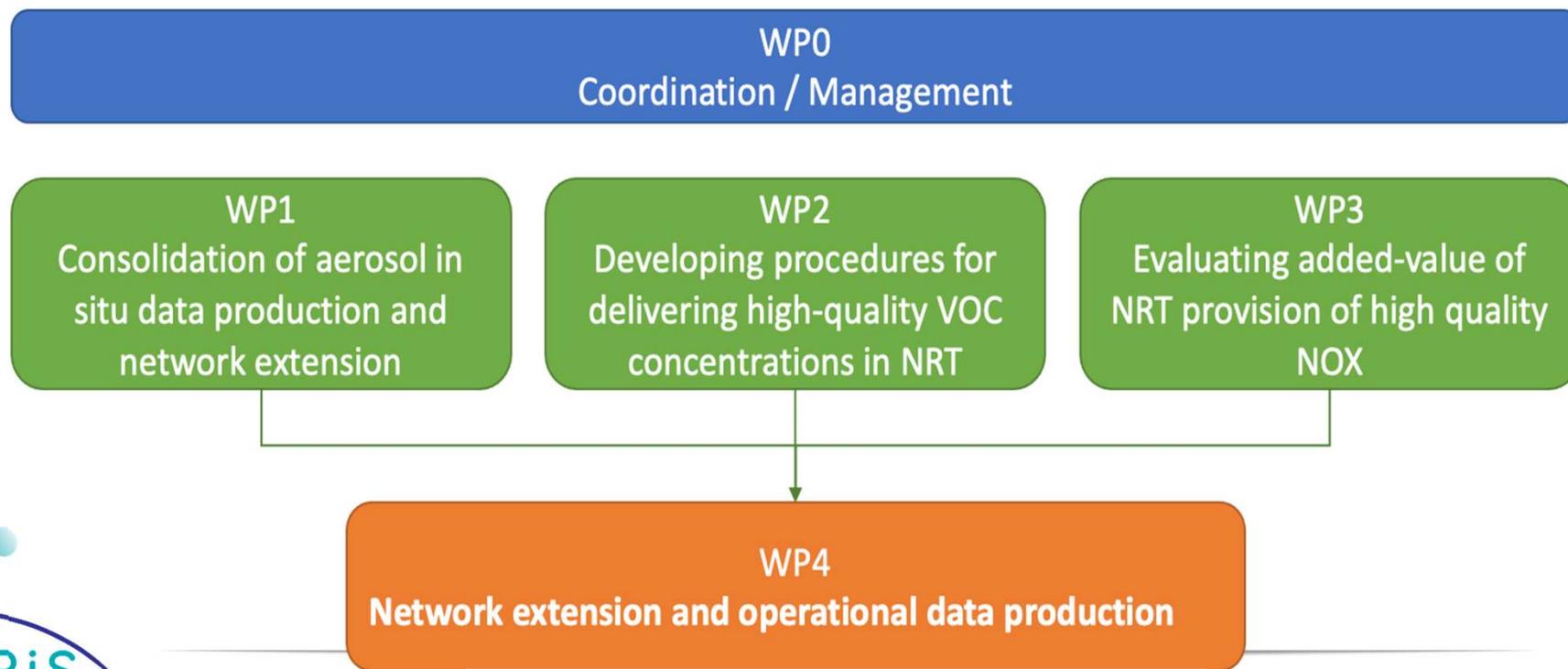
At the end of the project, we expect that conditions for NRT delivery to CAMS will be agreed upon by the whole ACTRIS community and with CAMS to enter a more operational mode.



CAMS 21a Phase 1

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CAMS 21a Phase 2 (2023 - ...) - structure



CAMS 21a Phase 2 – WP1

Continuing development of procedures for AIS data production

Identified problems during phase 1

Resolving problems in phase 2

Complexity of software

- Large number software components and operating systems
- High effort for installation and support



- Software will be made available in easy to use, pre-configured virtual machines

Monitoring of data flow

- Automated processes require better supervision by the user



- Work has begun to integrate a more user-friendly local database and improved data visualization

Documentation of metadata

- Diversity of device types and inlet systems requires improved documentation



- Storage of instrument and infrastructure metadata (e.g. inlet systems) in a central database

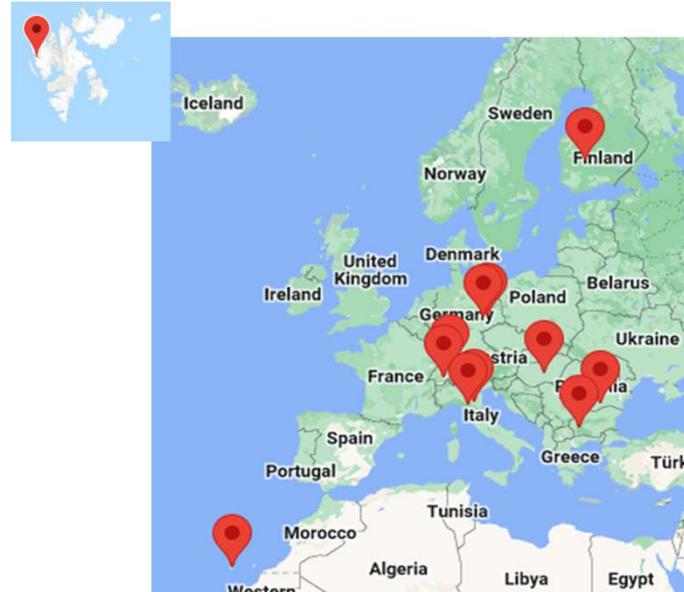


Aerosol microphysics: Current status (Jan. 2023) of NRT data submission

Scattering Coefficients



Absorption Coefficients



Fine-Range Particle Number Size Distribution

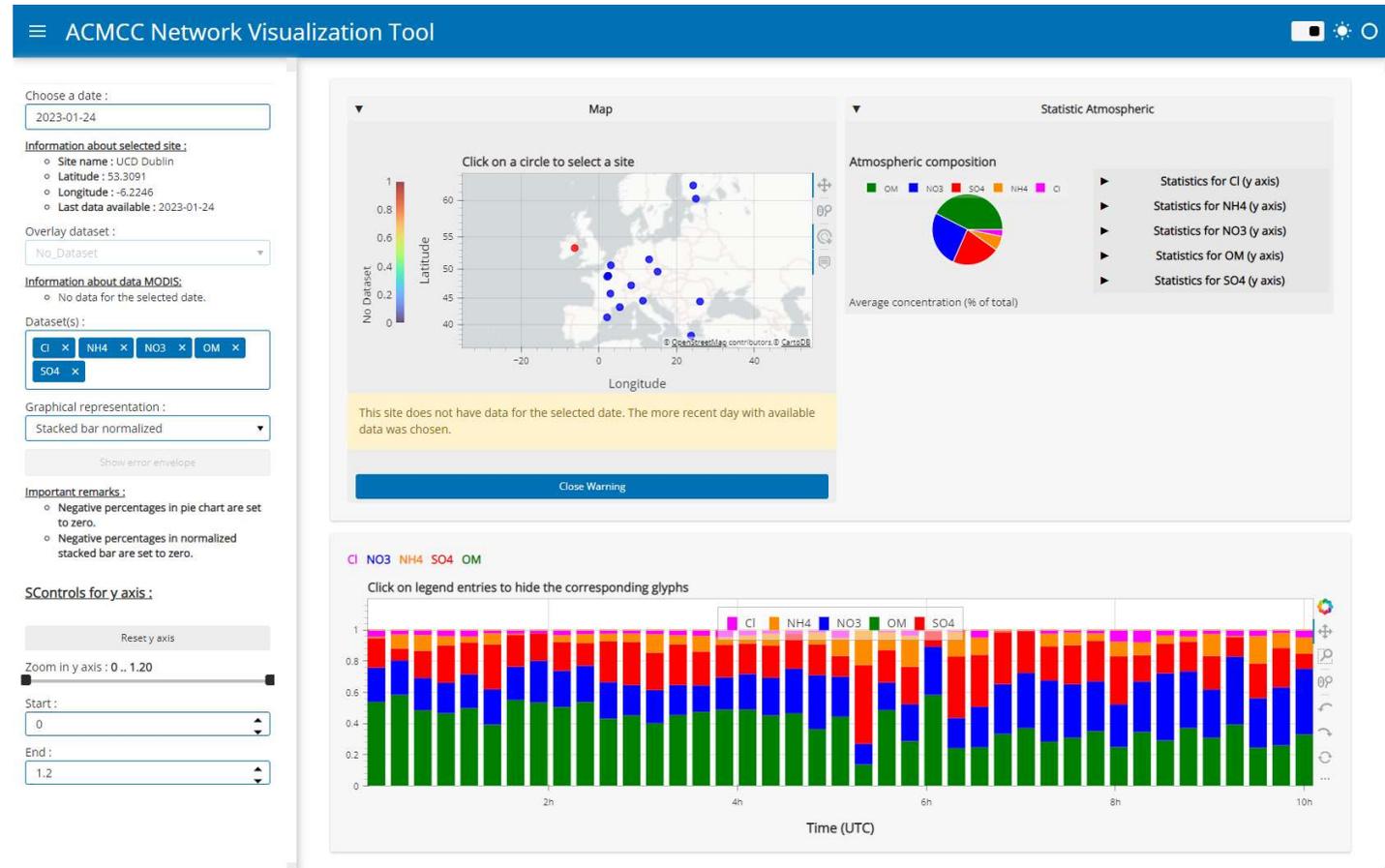


Parameter	# sites online	# with ACTRIS procedures
aerosol particle light scattering coefficient	13	1
aerosol particle light absorption coefficient	12	6
aerosol particle number concentration	1	1
aerosol particle number size distribution	6	2



Chemical speciation (ACSM) - NRT CAMS21a + RI-Urbans pilot sites (current situation)

- So far, 16 stations have been tested and connected to ECAC-ACMCC monitoring interface
- Direct transfer from station to ACTRIS DC successfully tested for 2 stations and operational for 1 (Melpitz)
- In coming months (by June 2023):
 - Deployment of the ACTRIS procedures at a dozen of stations (Quadrupole ACSMs)
 - ToF-ACSM procedures upgrades



Targets for NRT submission in next 3-4 years

- Updates of all CAMS21a pilot sites with new software
- Implementation of about **15** new stations in average per year (multiple devices per station possible)
- Annual workshops for training in installation and use of the software.
- Direct support will be provided to participants of the training sessions.



CAMS 21a Phase 2 – WP1

Production of equivalent Black Carbon (eBC) Level3 data

- Task 2113: Definition of requirements to produce eBC mass concentrations from aerosol absorption measurements.

Deliverables				
#	Responsible	Nature	Title	Due
D21.1.1.1	ECAC- INERIS	Report	Guidance to produce eBC mass concentrations from NRT ACTRIS aerosol absorption measurements	M12
Milestones				
#	Responsible	Title	Means of verification	Due
M21.1.1.1	ECAC- INERIS	Requirements to produce eBC concentrations from absorption measurements	Summary of the main outcomes of meetings with international experts (ACTRIS partners and ACTRIS users)	M10



- A series of meetings (4) anticipated in 2022
- Final/decision meeting to be organized in March-April 2023
- Expected procedures: ACTRIS NRT eBC level3 data product to be estimated using a constant scaling factor (following investigation by Zanatta et al., ACP, 2016)

CAMS2-21a WP4: Tasks & Milestones / Deliverables

- **To operate the ACTRIS in situ RT data production workflow.**
 - M21a.4.1.1; NILU; M5; Short report
Status report of ACTRIS In Situ RT data infrastructure
 - D21a.4.1.1; NILU; M27; Report
Report on status of ACTRIS In Situ RT data infrastructure (coverage, inspection, maintenance).
- **To ramp-up and maximize the number of ACTRIS stations and instruments delivering aerosol and VOC/NMHC in-situ data on a RRT/NRT schedule.**
 - M21a.4.2.1; ECAC; M11; Short report
Progress report on upscaling RT data provision for ACTRIS aerosol in situ parameters.
 - D21a.4.2.1; ECAC; M26; Report
Report on upscaling RT data provision for ACTRIS aerosol in situ parameters.
 - D21a.4.2.2; CIGAS; M27; Report
Report on implementing RT data production for VOC and NMHC parameters.
- **To upgrade tools and interfaces for monitoring and maintaining the ACTRIS RT data production workflow.**
 - M21a.4.2.2; CIGAS; M11; Short report
Progress report on implementing RT data production for VOC and NMHC parameters.
 - D21a.4.3.1; NILU; M23; Report
Report on implementing scalable data production workflow tool.

